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TOO MUCH OF A GOOD THING: A DISCUSSION OF EXCESSIVE ADVISORIES, CAUTIONS, AND WARNINGS (ACAWS) IN THE E-2D AIRCRAFT

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ABSTRACT
The E-2D Advanced Hawkeye is the Navy's most modern airborne early warning command and control platform. Projected threats necessitated significant upgrades to both the airframe and the mission systems of the E-2. On August 3, 2007 the first of two E-2D Advanced Hawkeye aircraft took to the skies and today both aircraft are fully engaged in test flights at NAS Patuxent River, Md. by a Navy and Northrop Grumman Integrated Test Team.

One of the most notable design enhancements was the addition of a glass cockpit. Unlike the outdated E-2C cockpit which is comprised of 1950's vintage boiler gauges, the E-2D cockpit incorporates three 17 inch glass displays for presentation of both flight and mission information. Additionally, the Intercommunications System sends to the aircrew an aural tone whenever any of the Advisory, Caution, and Warning System (ACAWS) lights is illuminated.

Engineers attempting to integrate the mission systems information into the cockpit displays were faced with significant human factors issues, especially with the ACAWS. As a development program, this was to be expected, but the extent to which nuisance aural and visual ACAWS affected testing was surprising to the team. The system has the capability of alerting the crew to cover 200 individual annunciations, some triggered by 100 different built-in-test failures, whereas the E-2C only had 58 total ACAWS that were never accompanied by an aural tone.

This paper will focus on the design philosophy behind the ACAWS and the unique human factors challenges the team encountered. References from flight test events will illustrate how aircrew became desensitized to excessive cockpit annunciations and failed to recognize actual system failures in a timely manner. Finally, lessons learned regarding ACAWS logic and implementation will be discussed, and the role the test pilot and flight test engineer should take in making the aircraft a better product.